# Comparison of reprogramming efficiency between transduction of reprogramming factors, cell-cell fusion, and cytoplast fusion.

**Journal:** Stem Cells

**Publication Year:** 2010

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**PubMed link:** 20572011

**Funding Grants:** New Technology for the Derivation of Human Pluripotent Stem Cell Lines for Clinical Use, Defining the molecular mechanisms of somatic cell reprogramming, CIRM Stem Cell Biology Training Grant

**Public Summary:**
This paper reported somatic cell reprogramming using lentiviral delivery and other methods.

**Scientific Abstract:**
Reprogramming human somatic cells into pluripotent cells opens up new possibilities for transplantation therapy, the study of disease, and drug screening. In addition to somatic cell nuclear transfer, several approaches to reprogramming human cells have been reported: transduction of defined transcription factors to generate induced pluripotent stem cell (iPSC), human embryonic stem cell (hESC)-somatic cell fusion, and hESC cytoplast-somatic cell fusion or exposure to extracts of hESC. Here, we optimized techniques for hESC-human fibroblast fusion and enucleation and cytoplast fusion, and then compared the reprogramming efficiency between iPSC generation, cell-fusion and cytoplast-fusion. When compared with iPSC, hESC-fusion provided much faster and efficient reprogramming of somatic cells. The reprogramming required more than 4 weeks and the efficiency was less than 0.001% in iPSC generation, and it was less than 10 days and more than 0.005% in hESC-fusion. In addition, fusion yielded almost no partially reprogrammed cell colonies. However, the fused cells were tetraploid or aneuploid. hESC cytoplast fusion could initiate reprogramming but was never able to complete reprogramming. These data indicate that in cell fusion, as in nuclear transfer, reprogramming through direct introduction of a somatic nucleus into the environment of a pluripotent cell provides relatively efficient reprogramming. The findings also suggest that the nucleus of the host pluripotent cell may contain components that accelerate the reprogramming process.